PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : B65D 5/70, 5/74, 51/20

A1

(11) International Publication Number: WO 00/56612

(43) International Publication Date: 28 September 2000 (28.09.00)

(21) International Application Number: PCT/IB00/00262

(22) International Filing Date: 10 March 2000 (10.03.00)

(30) Priority Data:
9901024-1 22 March 1999 (22.03.99) SE

(71) Applicant *(for all designated States except US)*: TETRA LAVAL HOLDINGS & FINANCE S.A. [CH/CH]; 70, avenue Général-Guisan, CH-1009 Pully (CH).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: ODET, Philippe [FR/FR]; Route de Montluzin, F-69380 Chasselay (FR).

(74) Agent: BENTZ, Christer; AB Tetra Pak, Ruben Rausings Gata, S-221 86 Lund (SE).

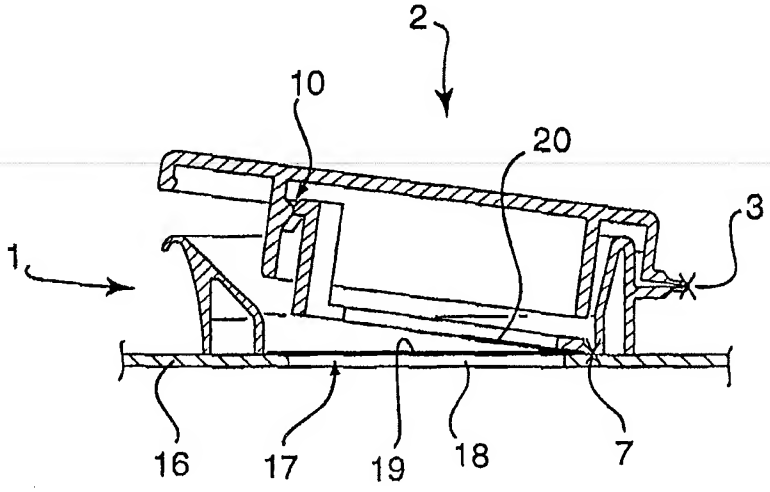
(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: AN OPENING ARRANGEMENT

(57) Abstract

Opening arrangements for packaging containers, e.g. consumer packages for drinks, normally have a main portion connected to the packaging container and being in the form of a frame which extends at least partly around an openable region. The opening arrangement moreover has a lid and an opening portion which are pivotally connected to the main portion for movement between a closed and an open position around axes which are mutually parallel but located in spaced apart relationship. In order to facilitate the opening phase and to give the consumer an opportunity to decide whether the package has been previously opened, the opening portion is connected to the openable region (17), both the lid (2) and the opening portion (8) including mechanical connecting members (10) which interconnect the opening portion (8) with the lid (2) when these are in the closed position, but release the opening portion from the lid when they are in the open position.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

AN OPENING ARRANGEMENT

TECHNICAL FIELD

The present invention relates to an opening arrangement for a packaging container with an openable region, the opening arrangement essentially comprising a main portion which is connected to the packaging container and having a frame which extends at least partly around the openable region of the packaging container, the opening arrangement further including a lid and an opening portion which are pivotally connected to the main portion for movement between a closed and an open position about axes which are mutually parallel but located in spaced apart relationship from one another.

BACKGROUND ART

Within the packaging industry, use has long been made of opening arrangements of a multiplicity of different types for facilitating the opening of the packages and thereby making for access to the contents of the package. Consumer packages for various types of drinks, e.g. mineral water, juice, milk or the like, are manufactured in different sizes and from various materials, but all display some form of opening arrangement. Such widely differing packaging types as, for example, the brick-shaped package manufactured from laminated paper/plastic laminate and known under the registered trademark Tetra Brik® and often employed for packing, for instance milk or juice and a blow moulded bottle of the type which is often employed for carbonated or still mineral water both include known opening arrangements which are separately manufactured by injection moulding of thermoplastic material and are thereafter applied on the individual packaging containers. In order to ensure the gas tightness of the packaging containers and make it possible for the consumer to be certain that the packaging containers have not previously been opened, many opening arrangements moreover include some form of pull-tab or membrane which is ruptured or removed only in connection with the opening of the package. This often takes place more or less automatically in connection with the unscrewing or folding open of the cap or lid of the package, but it is also common to design the openable region of the package as a separate tear-off strip of rupturable membrane which, only after the opening of an outer cap

or lid, becomes accessible to the consumer and can be torn off in a separate operation. Reclosure of the opened packaging container thereafter takes place utilising the cap or lid, i.e. without the strip or membrane being reused.

A prior art packaging container with an opening arrangement of injection moulded thermoplastic material applied on the outside of the packaging container, together with a separate tear-off pull-tab is described in European Patent No. EP 658.480, to which reference is now made for further information. This patent specification discloses how an injection moulded opening arrangement with a frame-shaped or annular main portion is placed over a prefabricated pouring aperture in the wall of the packaging container. The pouring aperture is sealed in liquid-tight fashion by a pull-tab whose one end is double-folded and connected by gluing to a projecting portion at the underside of the lid. When the lid is lifted by the consumer from the closed towards the open position, the connection between the lid and the double-folded portion of the strip will entail that this folded strip portion is lifted up out of the annular portion of the opening arrangement so that it will become more readily accessible to the consumer. This function presupposes that the glue connection between the folded end portion of the strip and the lid is automatically released after a certain upward pivoting of the lid, since otherwise the strip begins to come loose from the packaging container before the consumer is in a position to observe this event and thereby be sure that the package has not previously been opened. The connection between the folded end of the strip and the lid portion must, however, be of such strength that the strip does not come loose from the lid portion beforehand. This adaptation of the strength of the glued bond or connection between the strip and the lid has, in practice, proved difficult to realise with sufficient accuracy and there is, therefore, a need in the art to provide some other type of connection which ensures satisfactory function and obviates the necessity of a glued connection of predetermined strength.

The functional principle of the above-mentioned type of opening arrangement is, of course, applicable to other types of packaging containers, for example bottles. However, a difficulty arises in such instance because the strip or membrane which is utilised for covering the mouth of the bottle is located at and sealed against the upper edge of the neck of the bottle which in turn is covered by a part of the separately manufactured opening arrangement abutting against the membrane. In such instance, it will be

difficult to provide the membrane with a double-folded portion which may serve as a gripping member when the consumer is to gain access to the contents of the bottle. Consequently, a tear-off covering strip is not normally employed together with bottles, rather a membrane of the type which is to be ruptured one way or another in connection with the opening of the packaging container. For example, the cap portion of the opening arrangement may be provided with an inner cutting edge which, when the packaging container is opened, is first pressed down through the membrane and thereafter lifted. This and other per se known opening principles are, however, not readily comprehensible to the consumer and it has, in practice, also proved that such an arrangement suffers from an occasionally unreliable function, since parts of the membrane readily remain in the neck of the packaging container and prevent or disrupt the pouring of the contents of the bottle. There is, therefore, also a need in consumer packages of, for example, the bottle or can type, to realise an opening arrangement which includes a prefabricated pouring aperture with a covered but openable region, the opening arrangement displaying reliable and readily comprehensible function and not requiring any major or costly modifications of known, well-operating main principles for separately manufactured opening arrangements.

Hence, for the above reasons, there is a general need in the art to realise an opening arrangement for drink packages of consumer size, the opening arrangement including a prefabricated portion injection moulded from thermoplastic material and disposed over a prefabricated pouring aperture in the packaging container. The pouring aperture is sealed by means of a covering strip or a membrane and thereby forms an openable region which, in connection with the initial opening of the packaging container, is ruptured in a manner which is obvious to the consumer and thereby not only serves as a liquid (and possibly gas-) tight seal of the packaging container, but also as a guarantee seal which ensures that the package has not previously been tampered with or opened.

OBJECTS OF THE INVENTION

One object of the present invention is thus to realise an opening arrangement of the type disclosed by way of introduction, the opening arrangement comprising an opening portion connected to the openable

region of the packaging container and automatically becoming accessible and grippable to the consumer when the opening arrangement is opened, and making for a simple rupturing of the openable region of the packaging container.

A further object of the present invention is to realise an opening arrangement with an opening portion which is automatically lifted up to a position convenient to the consumer in connection with the opening of the opening arrangement.

Yet a further object of the present invention is to realise an opening arrangement with an opening portion which includes a gripping member of ergonomically suitable configuration.

Still a further object of the present invention is to realise an opening arrangement of the type described by way of introduction, the opening arrangement being usable in both that type of package which displays a prefabricated pouring aperture which is covered by a pull-tab and that type of package which has an opening covered by a tear-off membrane.

Yet a further object of the present invention is to realise an opening arrangement of the type described by way of introduction, the opening arrangement not suffering from the drawbacks inherent in prior art, similar opening arrangements.

Still a further object of the present invention is finally to realise an opening arrangement of the type described by way of introduction, the opening arrangement displaying both reliable and dependable function and a design which makes such function obvious to the consumer.

SOLUTION

The above and other objects have been attained according to the present invention in that an opening arrangement of the type described by way of introduction has been given the characterizing feature that the opening portion is connected to the openable region, both the lid and the opening portion including mechanical connecting members which interconnect the opening portion with the lid when this is in the closed position, but release the opening portion from the lid when this is in the open position.

Preferred embodiments of the arrangement according to the present invention have further been given the characterizing features as set forth in the appended subclaims.

ADVANTAGES

By providing, in accordance with the present invention, the lid and the opening portion of the opening arrangement with cooperating members which, in form-locked fashion, engage with one another during the first phase of the opening movement, it will be ensured that the opening portion accompanies the lid and is pivoted up to a position in which it may readily be grasped by the consumer. By replacing the earlier glue connection by mechanical connecting members, the risk is avoided that the opening function as a whole be jeopardised as a result of the varying strength of the glue bond, which is an obvious risk since the gluing of the folded end of the membrane to the lid portion in prior art embodiments takes place after the forming of the packaging container, i.e. when this has been filled with relatively cool liquid contents and may thus, because of condensation, display a damp outer surface. Given that the opening portion, during handling and assembly, is connected in one piece to the opening arrangement as a whole, the assembly of the opening arrangement is facilitated at the same time as the pivot axes of the opening portion and lid have given mutual positions, which ensures subsequent satisfactory opening function.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Three preferred embodiments of the arrangement according to the present invention will now be described in greater detail hereinbelow, with particular reference to the accompanying, schematic Drawings which show only those details indispensable to an understanding of the present invention. In the accompanying Drawings:

Fig. 1 is a side elevation, partly in section, of first embodiment of the arrangement according to the present invention in the open state;

Fig. 2 is a section, on a larger scale, of the opening arrangement according to Fig. 1 applied over an openable region of a packaging container and partly opened;

Fig. 3 is a perspective view of the arrangement according to Figs. 1 and 2;

Fig. 4 is a perspective view of a second embodiment of the opening arrangement according to the present invention;

Fig. 5 is a section through a third embodiment of the opening arrangement according to the present invention, particularly intended for bottle-shaped packaging containers; and

Fig. 6 is a section through Fig. 5.

DESCRIPTION OF PREFERRED EMBODIMENTS

The different embodiments of the opening arrangement according to the present invention which are illustrated in the accompanying Drawings display substantially similar construction and function, but are adapted to cater for an optimum function in combination with different types of per se known packaging containers. Thus, the first embodiment of the opening arrangement according to the present invention, which is shown in Figs. 1, 2 and 3, is particular designed for and intended to be used together with that type of single use disposable packages which is manufactured from a flexible laminated paper/plastic laminate and normally employed for packing juice, milk or other still drinks. The opening arrangement according to Fig. 4 is also principally intended for cooperation with packages of paper/plastic laminate, but its function is also suitable for use in bottle-shaped packaging containers, as will be described in greater detail below. The third embodiment of the opening arrangement according to the present invention, which is illustrated in Figs. 5 and 6, is specifically designed for use together with blow moulded plastic bottles of the type which is normally employed for packaging, for example mineral water, including carbonated mineral water.

As was mentioned above, the major purpose and function of the opening arrangement according to the present invention are similar for the different described embodiments, and, for example, all are preferably manufactured by injection moulding of thermoplastic material, for example polyethylene or other plastics of similar type. All embodiments of the opening arrangement according to the present invention are further provided with a main portion 1 which is connected to a lid 2 by the intermediary of a hinge joint 3 which most simply consists of an attenuated

portion of the plastic material. The main portion 1 has a frame 5 extending around a central outflow aperture 4, and the frame may be circular, elongate, rectangular or display any other suitable configuration adapted to the type of packaging container with which the opening arrangement is employed. As will be apparent, for example, from Figs. 1 and 2, the frame 5 may (for reasons of production engineering) also be partly twin-walled, the inner wall 5' defining and delimiting the outflow aperture 4, while the outer wall portion 5" forms the outside of the frame. The two wall portions 5' and 5" merge, at the upper region of the frame 5, into a common edge which, at the portion of the frame 5 opposite the hinge joint 3, forms a pouring edge 6 so as to permit emptying of the liquid contents of the packaging container in a concentrated and well-aimed jet. At the rear portion of the frame 5, the hinge joint 3 is connected to the outer wall portion 5" of the frame 5, while the rear frame portion 5' is pivotally connected, by the intermediary of a weakened portion serving as a hinge joint 7, to an opening portion 8 which is located in the outflow aperture 4. The opening portion 8 also includes, at its end facing away from the hinge joint 7, a gripping member 9 which extends upwards flush with the upper edge of the frame 5. At the upper region of the gripping member 9, there is a mechanical connecting member 10 in the form of a catch 11 which is located at the outside of the opening portion and is thus turned to face away from the hinge joint 7. Both of the hinge joints 3 and 7 are parallel with one another but located in spaced apart relationship. When the opening arrangement is mounted on a packaging container, the two hinge joints 3 and 7 extend substantially in a plane which is parallel to the upper side of the packaging container, or the openable region of the packaging container, as will be described in greater detail below.

For reasons of production engineering, the main portion 1 of the opening arrangement is provided with a number of cavities or grooves which, however, are of no importance to the present invention, nor do they affect the function of the opening arrangement. Hence, these production engineering details will not be described in greater detail, and it is also assumed that they may have a different configuration, as is likely to be self evident to a person skilled in the art of injection moulding.

The lid 2 of the opening arrangement includes a substantially planar upper portion 12 from which an annular edge 13 extends downwards (if the opening arrangement as considered in Fig. 2 in the wholly or partly closed

position). The edge 13 is of a configuration and outer dimension which substantially corresponds with or is slightly less than the inner dimension of the outflow aperture 4. On its inside, the edge 13 displays a mechanical connection member 10 in the form of a projection 14 which extends in a direction towards the hinge joint 3 connecting the lid 2 to the main portion 1. The projection is intended to cooperate in form-locked fashion with the catch 11, as will be described in greater detail below. The lid 2 also includes an edge region 15 which extends around the lid and which, in the closed position of the lid, abuts against or substantially covers the pouring edge 6 and the remaining upper edge of the frame 5 extending around the main portion 1. The front part of the edge region 15, i.e. the part facing away from the hinge joint 3, may be designed with a projecting portion to assist the consumer in grasping the lid when this is to be opened by pivoting about the hinge joint 3.

The opening arrangement according to the present invention is shown in Fig. 2 applied on a packaging container of per se known type, i.e. a packaging container of the type described in European Patent No. 658.480, to which reference is now made for further information. This type of packaging container is manufactured from a paper/plastic laminate which forms an upper wall 16 of the packaging container. The wall 16 has an openable portion 17 in the form of a pouring aperture 18 which is covered by a membrane 19. In the embodiment of the opening arrangement according to the present invention illustrated in Figs. 2 and 3, the membrane 19 consists of a pull-tab which is sealed in liquid-tight fashion to the wall 16 in a region around the pouring aperture 18 and is provided with a double-folded end portion which is connected to the lower surface of the opening portion 8 located most proximal the hinge joint 7. Preferably, the end portion 20 is connected to the opening portion 8 by thermosealing, which is also utilised for sealing the membrane 19 to the wall 16 in the liquid-tight seal around the pouring aperture 18. As is apparent from Fig. 2, the membrane 19, including its double-folded end portion 20, is located inside the frame 5 of the main portion 1, i.e. within those limits which are defined by the wall 5' of the outflow aperture 4. This is characteristic of the first embodiment of the opening arrangement according to the present invention which is illustrated in Figs. 1, 2 and 3, while, in the other embodiments, the membrane 19 extends in beneath and is sealed between the frame 5 of the main portion

and a subjacent portion of the packaging container, as will be described in greater detail below.

The embodiment of the opening arrangement according to the present invention shown in Figs. 1 and 2 is also illustrated in Fig. 3, in the partly open position, and it should probably present no difficulty to identify the already described parts of the opening arrangement from the reference numerals. However, an additional number of parts is apparent from Fig. 3, namely a number (preferably three) of bridges 21 which are located between and interconnect the inner wall 5' of the frame 5 with the opening portion 8 located in the outflow aperture 4. By interconnecting these parts by means of frangible bridges 21, not only is the production of the opening arrangement according to the present invention facilitated, but, above all, its assembly and sealing to the upper wall 16 of the packaging container (the membrane/strip 19, respectively), since orientation and sealing of the injection moulded opening arrangement may take place in its entirety with good precision and in one operational cycle. Ghosted lines are also used in Fig. 3 to illustrate how the subjacent, double-folded end portion 20 of the membrane 19 designed as a pull-tab, is placed in relation to the opening portion 8. The opening portion 8 (which besides displays a central aperture provided for reasons of production engineering) is, as has previously been described, provided at its front end with the upwardly directed gripping member 9 provided with the catch 11. Ghosted lines also illustrate how, in a modified embodiment, the catch 11 may be replaced by two catches 11', located on opposite sides of the opening portion 8 and cooperating with correspondingly placed projections (not shown in the Figure) at the inside of the edge 13. This placing of the catches 11' may, in certain cases, be to be preferred, for example if the intention is to design the front end of the opening portion 8 as an ergonomically particularly well designed gripping member. Otherwise, the function of the catches is similar and the selection of number of catches or their placing should probably be freely variable without departing from the scope of the inventive concept as herein disclosed. In such instance, it is above all essential that the distance between the hinge joint or pivot axis 7 of the catch (catches) 11 and the opening portion 8 is less than the distance between the hinge joint or pivot axis 3 of the lid 2 and the projection 14. This relates to the active portions of the catch (catches) and the projection, respectively, i.e. those mutually facing surfaces

which cooperate with one another in the closed or almost closed position of the opening arrangement. In order to make for a correct opening movement of the opening portion 8, it is also crucial that the hinge joint or pivot axis of the opening portion 8 is located in the same surface plane as the openable region, i.e. in the surface plane of the membrane 19. Since a correct, form-locked cooperation between the two connecting members 10 presupposes that the length of the fulcrum which is formed between the catch 11 and the hinge joint 7 of the opening portion 8 is shorter than the length of the fulcrum which is formed between the projection 14 and the hinge joint 3 of the lid 2, the pivot axis or hinge joint 7 of the opening portion 8 will, in the described embodiments, be located within the frame 5 of the main portion 1, while the pivot axis or hinge joint 3 of the lid 2 will be located on the outside of the frame 5 of the main portion 1. In reality, the total length of the opening arrangement is approx. 50 mm and its total height approx. 5 mm. In this instance, the fulcrums of the opening portion 8 and the lid 2 are approx. 40 and 30 mm, respectively, i.e. there is an approx. 25% length difference, as will be described in greater detail in the following functional description.

The above-described first embodiment of the opening arrangement according to the present invention is manufactured, as has been mentioned, by injection moulding of thermoplastic material, e.g. polyethylene, and is then formed in the open position as shown in Fig. 1. After the injection moulding, or at the latest in connection with the assembly of the opening arrangement on a packaging container, the opening arrangement is closed in that the lid 2 is pivoted through 180° around the pivot axis of the hinge joint 3, in which event the edge 13 of the lid 2 enters and substantially fills out the outflow aperture 4, while the opening portion 8 and its gripping member 9 will be located in the space which is formed in the lid inside the edge 13. In such instance, in the closed position of the opening arrangement, both of the mechanical connecting members 10 will engage in form-locked fashion with one another, i.e. the active surface of the projection 14 facing towards the hinge joint 3 comes into contact and passes the active surface of the catch 11 (with a certain resistance because of the size of the catch and the projection, respectively, as well as the flexibility of the material), in order, in the entirely closed position of the lid 2, to be locate immediately beneath and engage in form-locked fashion with the lid. Thus, the projection 14 will be located between the catch 11 and the lower surface of the opening portion facing

towards the membrane 19. A renewed opening of the lid by pivoting around the pivot axis of the hinge joint 3 will, therefore, entail that the catch 11 accompanies the projection 14 during simultaneous lifting of the opening portion 8 via the gripping member 9, as will be explained in greater detail below.

It is apparent from Fig. 2 how the closed opening arrangement according to the present invention has been sealed to the upper side of the packaging container, which is, more precisely, put into effect in that the lower surface of the frame 5 is thermosealed to the outer surface of the wall 16. The placing of the opening arrangement is, in this instance, such that the inner wall 5' of the frame 5 surrounds not only the openable region 17 with the pouring aperture 18 but is also located outside the outer edges of the membrane 19. However, it is also possible to cause a part of the membrane 19 to extend in under a portion of the frame 5 provided with a tearing edge, in such a manner as described, for example, in European Patent Application 97919839.7, to which reference is now made for further information. In other words, the membrane 19 is accessible inside the frame and, in connection with the application of the opening arrangement on the wall 16 of the packaging container, the double-folded end portion 20 of the membrane 19 is also sealed to the lower surface of the opening portion 8. Thus, the opening arrangement according to the present invention is, with the frame, connected to the outside of the packaging container around the openable region 17, at the same time as a part of the lower surface of the opening portion 8 is fixedly connected to the end portion of the membrane 19.

When a package provided with this first embodiment of the opening arrangement according to the present invention is to be opened by the consumer, the consumer grasps that part of the edge region 15 of the lid 2 which is turned to face away from the hinge joint 3 of the lid and lifts it straight upwards, i.e. away from the wall 16 of the packaging container. In such instance, the lid 2 will describe a pivotal movement about the pivot axis of the hinge joint 3 at the same time as the opening portion 8, through the mechanical cooperation between the two connecting members (i.e. the projection 14 engaging between the catch 11 and the membrane 19) accompanies in the pivotal movement away from the wall 16 of the packaging container, at the same time as the front bridges 21 between the frame 5 and the opening portion 8 are broken. The opening portion 8 now

pivots around the pivot axis defined by the hinge joint 7, this axis being partly located in the plane of the membrane 19 and partly located slightly more proximal the connecting members 10 than the pivot axis of the lid 2. The distance between the two mutually parallel pivot axes entails that the two connecting members 10 will not only pivot upwards from the wall 16 of the packaging container, but will also mutually move substantially in the plane of the lid 2. More precisely, the catch 11 will progressively slide from the projection 14, i.e. to the right in Fig. 2, until the active surfaces of both of the connecting members 10 are displaced away from one another and the projection 14 may be lifted past the catch 11, which is the position shown in Fig. 2. On the continued pivoting of the lid 2 clockwise around the hinge joint 3, the opening portion will no longer accompany the lid but, because of the rigidity partly of the double-folded membrane 19 and partly in the remaining, as yet unbroken bridge 21 between the opening portion 8 and the frame 5. Once the lid 2 has been pivoted to the fully open position, i.e. close to the position illustrated in Fig. 1, the consumer may readily grasp the front end of the opening portion 8 now extending outside the frame 5 and, with the aid of the gripping member 9, break the remaining bridge 21 and draw the opening portion out of the frame 5 whereupon - thanks to the fixed connection between the opening portion 8 and the double-folded end portion 20 of the membrane 19 - the membrane will be progressively released from the wall 16 so that it may be wholly removed and so the pouring aperture 18 is exposed. Hereafter, the consumer may, by gripping the packaging container and tilting it at the desired angle, ensure that the packed liquid contents flows out via the pouring aperture 18 and the substantially coinciding outflow aperture 4 in order to follow the pouring edge 6 of the frame 5 in a concentrated and controllable jet. After completed emptying, the consumer may, if so wishing, reclose the packaging container by once again pivoting the lid 2 from the open position illustrated in Fig. 1 to a closed position on a plane with the upper packaging container wall 16, whereupon the edge 13 of the lid 2 is once again pressed in place in liquid-tight fashion because its outer contour and dimension correspond with the inner dimension of the outflow aperture 4. Naturally, renewed opening of the packaging container may take place any desired number of times, but when the packaging container is opened a second time, it will be immediately apparent to the consumer that the packaging container had

previously been opened, since the opening portion 8 and with it the membrane 19 are removed so that the pouring aperture 18 is wholly exposed.

By replacing the earlier glued or thermosealed connection (described in the above-mentioned European Patent) between the double-folded end portion of the pull-tab and the lid with the described arrangement using cooperating connecting members 10, the function of the opening arrangement will be ensured since it is no longer dependent on a more or less haphazard sealing strength between the cooperating parts. Since the end portion 20 of the membrane 19 is fixed and permanently sealed to the opening portion 8, the consumer is also offered a grip-friendly portion to use when the membrane 19 is to be removed (instead of the short double-folded tab portion which is utilised in the design according to the above-mentioned European Patent and which is relatively difficult to grasp). As a result, not only a more reliable opening function will be obtained, but also a simpler and clearer method of use for the consumer.

As was mentioned previously, the catch 11 may be moved or replaced by two catches 11' located on opposite sides of the opening portion 8, their placing having been indicated by means of ghosted lines in Fig. 3. In such instance, the catch 11 is dispensed with and preferably replaced by a grip-friendly "handle" which further facilitates tearing-off of the membrane 19. The function is otherwise the same, i.e. the active surface of the catches 11' facing towards the hinge joint 7 cooperates with a counter-facing surface on two projections (not shown in Fig. 3) provided correspondingly in the lid 2. Upward pivoting of the lid, i.e. from closed towards open position, releases, after a certain lifting of the opening portion 8, the catches 11' from the projections so that the lid 2 may be pivoted to fully open position and the gripping member of the opening portion 8 will be readily accessible to the consumer. The bridges 21 interconnecting the opening portion 8 with the frame 5 are progressively broken, i.e. the two front bridges are broken in connection with the first upward pivoting of the lid 2, while the remaining bridge located at the hinge joint 7 is broken first in connection with the pulling off of the membrane 19. Preferably, the bridge 21 located at the hinge joint 7 may be of slightly more robust construction than the other bridges.

In the second embodiment of the opening arrangement according to the present invention which is illustrated in Fig. 4, corresponding parts have

been given the same reference numerals as in the other Figures. Since the embodiments of the opening arrangement according to the present invention as described with reference to Figs. 4, 5 and 6 are intended to cooperate with an openable region 17 which has a fully covering membrane 19 without double-folded end portion 20, the opening portions 8 in these embodiments are not designed to make possible pulling away of a membrane in the form of a pull-tab, but instead to make for penetration of the membrane 19 (which may also constitute a part of the packaging container wall, for example a layer in a packaging laminate), and removal of a central region thereof along a surface defined by the inner wall 5' of the opening arrangement. In this instance, the opening portion 8 will be of slightly different design and will now include a substantially annular portion 22 extending around the outflow aperture 4 and connected to the inner wall 5' of the surrounding frame 5 by the intermediary of the previously mentioned bridges 21, as well as two rear bridges 21' which are located in register with each other a slight distance from the rear end of the annular portion 22 and together define a hinge joint 7' which extends transversely over the gripping member 9 parallel with and a distance from the hinge joint 3 between the main portion 1 and the lid 2. As in the previously described, first embodiment, the hinge joint 7' is substantially parallel with and located in the plane of the membrane 19, but a slightly greater distance from the hinge joint 3, in which event the opening portion 8 will have a projecting part located between the hinge joint 7' and the hinge joint 3. This part includes a rigidified penetration portion 23 which is located at the rear end of the outflow aperture 4 immediately above the membrane 19.

Like the previously described embodiment, the opening portion 8 includes a gripping member 9' which, however, in this embodiment, is more elongate and extends within the annular portion 22 between the penetration portion 23 and the catch 11 located at the opposite end. In the region at the penetration portion 23 where the gripping member 9' merges in the annular portion 22, there are disposed the bridges 21' located on either side of the annular portion and defining, together with the flexible connection between the gripping member 9' and the annular portion 22 caused by the type of material, a hinge joint 7' around which the gripping member 9' of the opening portion 8 is pivotal. Lifting of the end of the gripping member 9

provided with the catch will, in such instance, force the projecting rear end portion of the penetration portion 23 downwards against the membrane 19.

When the opening arrangement according to Fig. 4 is to be opened by the consumer, the consumer grasps the edge region 15 of the lid 2 as previously described at the front end of the opening arrangement and lifts the lid 2 upwards. At such time, the lid will describe a pivotal movement about the hinge joint 3. By the cooperation between the mechanical connecting members 10, the catch 11 will, as in the previously described embodiments, be obliged to accompany in the upward movement out of the frame 5 of the main portion 1. In such instance, the catch 11 with the gripping member 9' will, because of the flexibility of the material, be pivoted around the hinge joint 7' defined by the bridges 21' until such time as both of the connecting members 10 are disengaged from one another because of the different lengths of the fulcrums, i.e. the distance between the two hinge joints 3 and 7'. As soon as the active, cooperating surfaces of the catch 11 and the projection 14, respectively, depart from one another, the lid 2 will be able to be pivoted further upwards to fully open position, while the gripping member 9' remains in a slightly raised position in relation to the position illustrated in Fig. 4. At this point, it will be easy for the consumer to grasp the gripping member 9' in the front end provided with the catch and continue to bend upwards, which results in a continued pivoting around the hinge joint 7' so that the rear, sharp end of the penetration portion 23 is urged downwards through the membrane 19. Continued pulling forwards and upwards in the gripping member 9' entails that both of the bridges 21' break, at which point the penetration portion 23, together with the annular portion 22 of the opening portion 8 fixedly sealed to the membrane 19 may be drawn out of the outflow aperture 4 defined by the inner wall 5' of the frame. In such instance, the membrane 19 will rupture along the edges of the inner wall 5', which may possibly be provided with some type of cutting arrangement, e.g. a sharp edge or a large number of fine teeth. When the membrane 19 (and the bridges 21) are ruptured around the entire circumference of the outflow aperture 4, the membrane may be removed together with the opening portion 8 out of the opening arrangement and the consumer is then able to empty the contents out of the packaging container and reclose it by returning the lid 2 to the closed position. This embodiment of the opening arrangement according to the present invention is thus also

easy to open, at the same time as giving a clear indication to the consumer that the package had previously been broken.

The third embodiment of the opening arrangement according to the present invention which is shown in Figs. 5 and 6 differs in principle but insignificantly from the embodiment illustrated in Fig. 4, but is more clearly formed for cooperation with the upper end of a bottle-shaped packaging container, e.g. an injection moulded plastic bottle of the type which is often employed for packaging both carbonated and still mineral water. Such a bottle normally has a projecting neck 24 at whose upper end the opening arrangement according to the present invention is mounted. Thus, this version of the opening arrangement according to the present invention has a substantially circular cross section adapted to the bottleneck, but nevertheless includes, like earlier embodiments, a main portion 1, a lid 2 and a hinge joint 3 interconnecting these parts. The lid 2 is thus capable of being pivoted from the closed position illustrated in the Figures to an open position in which the opening portion 8 located in the frame 5 of the main portion 1 is freely accessible to the consumer. Between the frame 5 of the main portion 1 and the upper end region of the bottleneck, the membrane 19 is disposed, which thus is fixedly sealed between the opening arrangement and the bottleneck and extends outside the outflow aperture 4 defined by the inner edge of the frame 5. Similarly, the membrane has no double-folded end portion and the packaging container must thus be opened in that the central region of the membrane 19 is wholly or partly torn off and removed. In order to make this possible, the opening portion 8 is specially designed, which partly corresponds with that described in connection with Fig. 4 , but differs in a few decisive points as will be described in greater detail below.

Also in this third embodiment, intended for plastic bottles, corresponding parts have been given corresponding reference numerals. Thus, the mutually cooperating connecting members 10 and opening portion 8 will be readily recognised from earlier embodiments, the opening portion here, as in the embodiment described in Fig. 4, including an annular portion 22 extending around the outflow aperture 4 and a similarly annular gripping member 9'. At the opposite side of the gripping member 9' in relation to the connecting members 10, the gripping member is connected to the annular portion 22 and displays, on the one hand, the projecting penetration portion 23, and on the other hand the hinge joint 7' defined by the flexibility of the

material and a weakening recess 25. The connection between the gripping member 9' and the annular portion 22 is asymmetric, since the annular portion 22 does not extend entirely around the outflow aperture 4. Because the annular portion 22 displays a discontinuation 26 located adjacent the penetration portion 23, the annular portion 22 and the membrane 19 fixedly connected thereto will be progressively torn up about the periphery of the outflow aperture 4, which is indicated by means of arrows in Fig. 6.

When the consumer is to open a bottle displaying an opening arrangement of the embodiment described in Figs. 5 and 6, the consumer first lifts the lid 2 by taking hold of its projecting edge region 15 at the side located diametrically opposite the hinge joint 3. In such instance, the lid 2 is pivoted upwards around the hinge joint 3, at the same time as the two mutually cooperating connecting members 10 ensure that the gripping member 9' of the opening portion 8 pivots somewhat upwards around the hinge joint 7', the penetration portion 23 of the opening portion 8 coming into abutment against the upper surface of the membrane 19. As soon as the mutual distance between the two hinge joints 7' and 3 has, in the manner corresponding to that in earlier embodiments, achieved the situation that the two mechanical connecting members 10 are released from each other, the lid 2 may be pivoted to fully open position. At this point, the gripping member 9' has been pivoted somewhat upwards and is now readily accessible to the consumer who takes hold of the gripping member 9' and lifts it slightly further upwards while pulling at the same time. At this point, the free end of the penetration portion 23 will penetrate the membrane 19 so that this ruptures, whereafter continued pulling of the gripping member 9' entails that the rupture runs around the periphery of the outflow aperture 4 in the direction indicated by means of the arrows in Fig. 6, at the same time as the bridges 21 between the annular portion 22 of the opening portion 8 and the surrounding frame 5 progressively break. When all bridges 21 have broken and the central region of the membrane 19 has been wholly released from the part of the membrane 19 tensioned between the opening arrangement and the neck 24 of the bottle, the gripping member can, with the associated released membrane portion, be removed out of the mouth of the bottle so that the consumer may pour out the desired quantity of contents. The packaging container is thereafter capable of being reclosed with the aid of the lid 2, which, in a previously described manner, is once again pivoted to

the position illustrated in Fig. 5 where it is retained in a liquid-tight, closed position by frictional engagement between the edge 13 and the frame 5.

The embodiments of the opening arrangement according to the present invention which have been described with particular reference to Figs. 4, 5 and 6 thus make it possible to utilise this type of opening arrangement also in such types of packages as have no membrane in the form of a double-folded pull-tab and instead display a penetrable, openable region in the form of a membrane or otherwise weakened, openable portion of a packaging container wall.

By realising an automatic, partial upward pulling of an opening portion out of the opening arrangement in connection with the lid's being opened for the first time, the opening function will, on the one hand, be obvious to the consumer and, on the other hand, tearing-off of the membrane will be facilitated at the same time as a reliable indication is given that this is the first time the packaging container has been opened. The different embodiments of the opening arrangement according to the present invention are thus advantageously applicable to different types of packaging containers while retaining a satisfactory and reliable function.

The present invention should not be considered as restricted to that described above and shown on the Drawings, many modifications being conceivable without departing from the scope of the appended Claims.

WHAT IS CLAIMED IS:

1. An opening arrangement for a packaging container with an openable region, the opening arrangement essentially comprising a main portion which is connected to the packaging container and having a frame which extends at least partly around the openable region of the packaging container, the opening arrangement further including a lid and an opening portion which are pivotally connected to the main portion for movement between a closed and an open position about axes which are mutually parallel but located in spaced apart relationship from one another, **characterized in that** the opening portion (8) is connected to the openable region (17), the lid (2) and the opening portion (8) including mechanical connecting members (10) which connect the opening portion (8) with the lid (2) when these are in the closed position, but release the opening portion from the lid when they are in the open position.

2. The opening arrangement as claimed in Claim 1, **characterized in that** the mutually connectable connecting members (10) include a catch (11) which is supported by the opening portion, and a projection (14) which is located on the inside of the lid.

3. The opening arrangement as claimed in Claim 2, **characterized in that** the distance between the catch (11) and the pivot axis (7) of the opening portion (8) is less than the distance between the pivot axis (3) of the lid (2) and the projection (14).

4. The opening arrangement as claimed in any one or more of Claims 1 to 3, **characterized in that** the pivot axis (7) of the opening portion (8) is located in the same surface plane as the openable region (17).

5. The opening arrangement as claimed in any one or more of Claims 1 to 4, **characterized in that** the pivot axis (7) of the opening portion (8) is located within the frame (5) of the main portion (1).

6. The opening arrangement as claimed in any one or more of Claims 1 to 4, characterized in that the pivot axis (3) of the lid (2) is located on the outside of the frame (5) of the main portion (1).

7. The opening arrangement as claimed in any one or more of Claims 3 to 6, characterized in that the length of the fulcrum which is formed between the catch (11) and the pivot axis (7) of the opening portion (8) is shorter than the length of the fulcrum which is formed between the projection (14) and the pivot axis (3) of the lid (2).

8. The opening arrangement as claimed in any one or more of Claims 1 to 7, characterized in that the openable region (17) is a membrane (19) which covers a prefabricated pouring aperture (18) in the wall (16) of the packaging container.

9. The opening arrangement as claimed in Claim 8, characterized in that the membrane (19) includes a double-folded end portion (20) which is connected to the opening portion (8).

10. The opening arrangement as claimed in any one or more of Claims 1 to 8, characterized in that the opening portion (8) is sealed to the openable region (17) to tear up and lift said region when the lid (2) is opened.

11. The opening arrangement as claimed in Claim 10, characterized in that it has a gripping member (9) which is pivotally connected to the portion (22) of the opening portion (8) connected to the openable region (17).

12. The opening arrangement as claimed in Claim 11, characterized in that the opening portion (8) includes a wholly or partly annular portion (22) which extends around the gripping member (9) and is connected to the openable region (17).

13. The opening arrangement as claimed in Claim 12, characterized in that the substantially annular portion (22) of the opening portion (8) includes a rigidified penetration portion (23) in the region of the pivotal connection with the gripping member (9).

14. The opening arrangement as claimed in Claim 13, characterized in that the annular portion (22) has a discontinuation (26) which is located at the one side of the penetration portion (23).

5

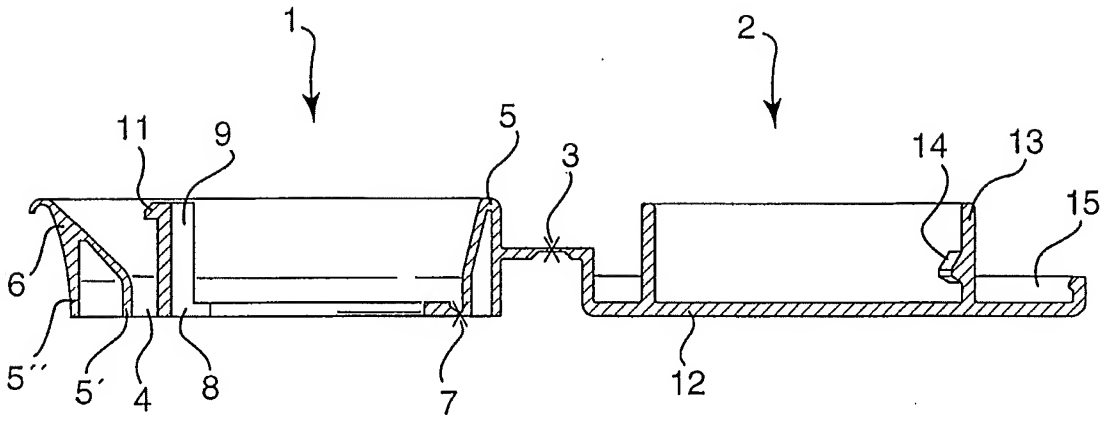


Fig 1

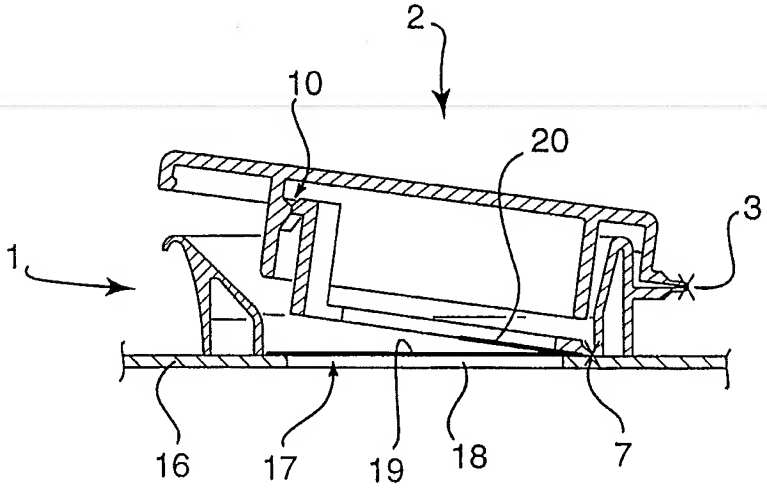


Fig 2

Fig 3

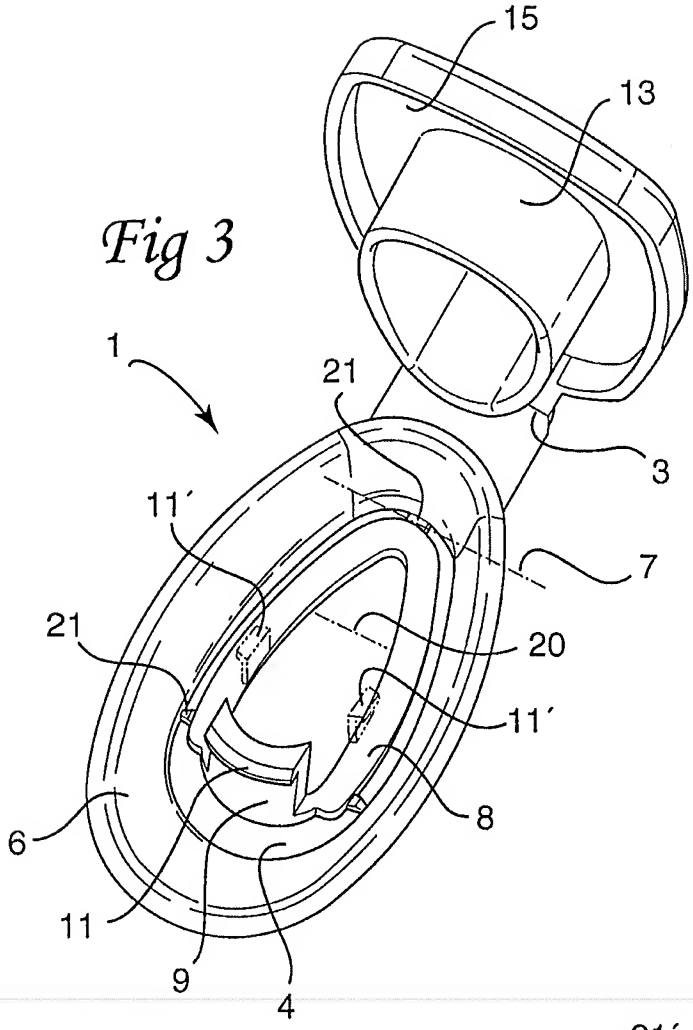
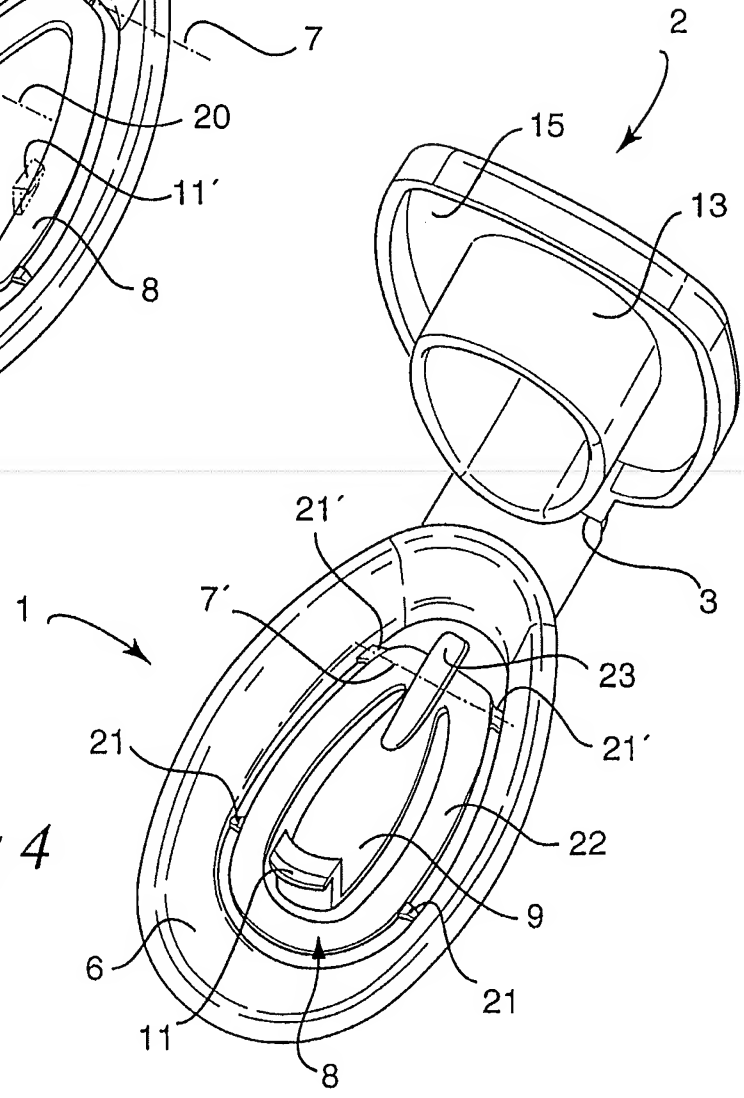


Fig 4



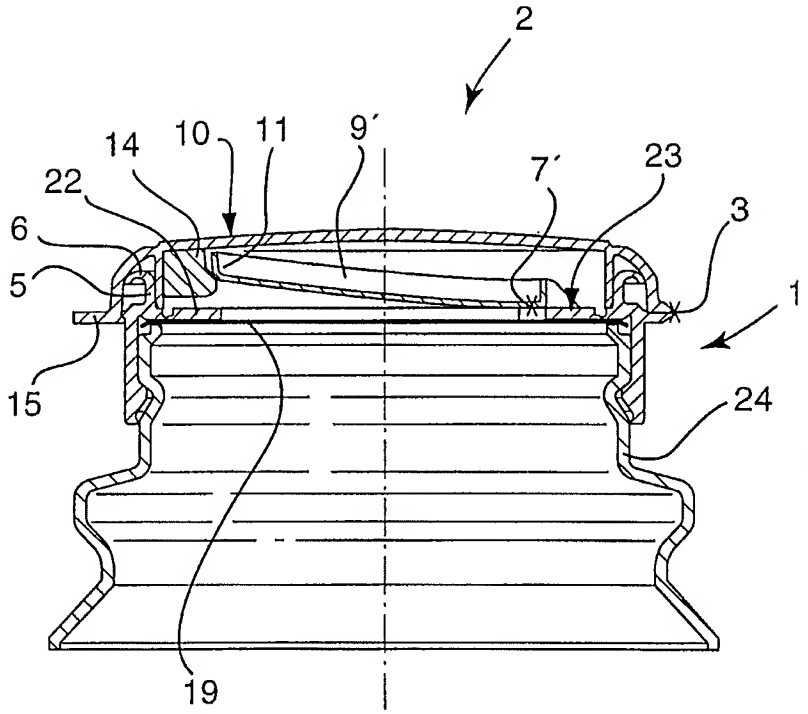


Fig 5

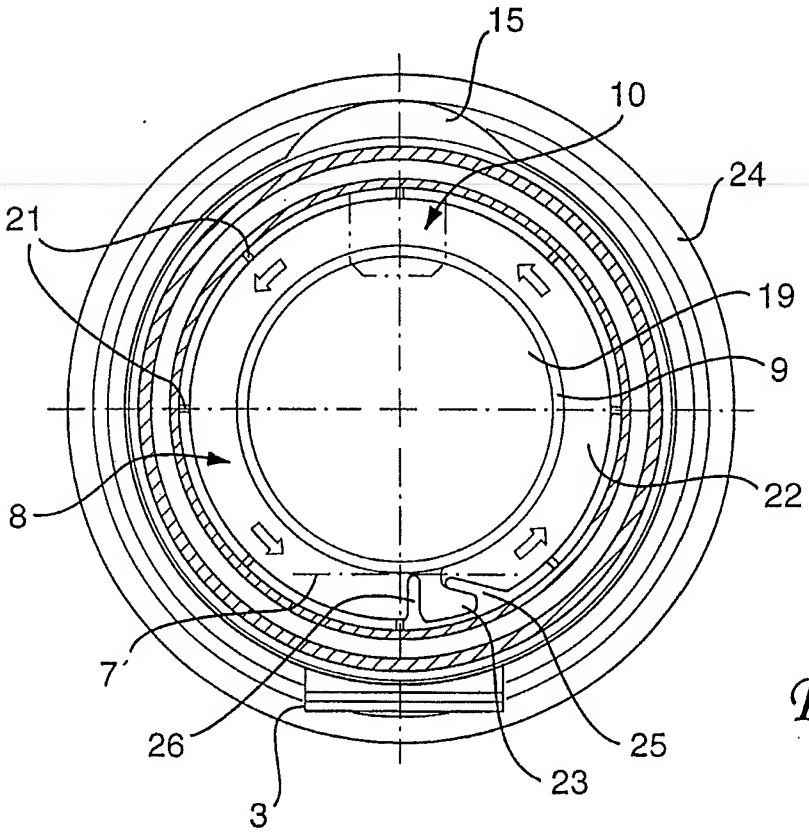


Fig 6

INTERNATIONAL SEARCH REPORT

Interr. nal Application No
PCT/IB 00/00262

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B65D5/70 B65D5/74 B65D51/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 658 480 A (TETRA LAVAL HOLDINGS & FINANCE) 21 June 1995 (1995-06-21) cited in the application the whole document	1
A	US 5 875 958 A (WEITEDER HANS JOSEF ET AL) 2 March 1999 (1999-03-02) figures 5-7	1
A	US 3 282 477 A (HENCHERT) 1 November 1966 (1966-11-01) figures 1-4	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 June 2000	23/06/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Spettel, J

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter nal Application No
PCT/IB 00/00262

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0658480 A	21-06-1995	SE 501329 C	16-01-1995
		AT 154313 T	15-06-1997
		AU 679280 B	26-06-1997
		AU 8049194 A	22-06-1995
		CA 2138307 A	18-06-1995
		DE 69403762 D	17-07-1997
		ES 2102758 T	01-08-1997
		JP 7277324 A	24-10-1995
		SE 9304200 A	16-01-1995
		US 5484101 A	16-01-1996
US 5875958 A	02-03-1999	DE 4409946 A	28-09-1995
		AT 160747 T	15-12-1997
		CA 2186233 A	28-09-1995
		CN 1146753 A	02-04-1997
		CZ 9602763 A	12-03-1997
		DE 59501077 D	15-01-1998
		WO 9525669 A	28-09-1995
		EP 0750564 A	02-01-1997
		ES 2109817 T	16-01-1998
		HU 74819 A,B	28-02-1997
		PL 317188 A	17-03-1997
US 3282477 A	01-11-1966	NONE	